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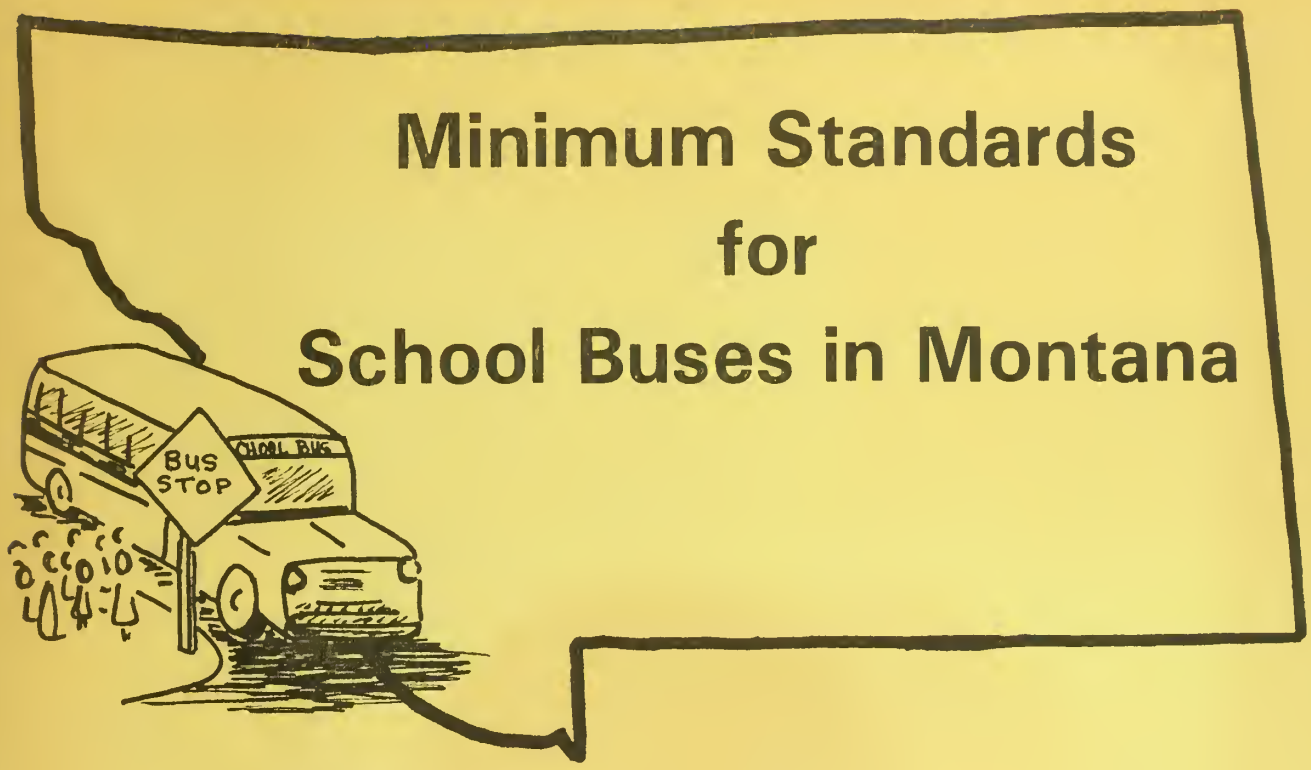

Minimum Standards for School Buses in Montana

State of Montana
Office of Public Instruction
Ed Argenbright, Superintendent
State Capitol
Helena, MT 59620

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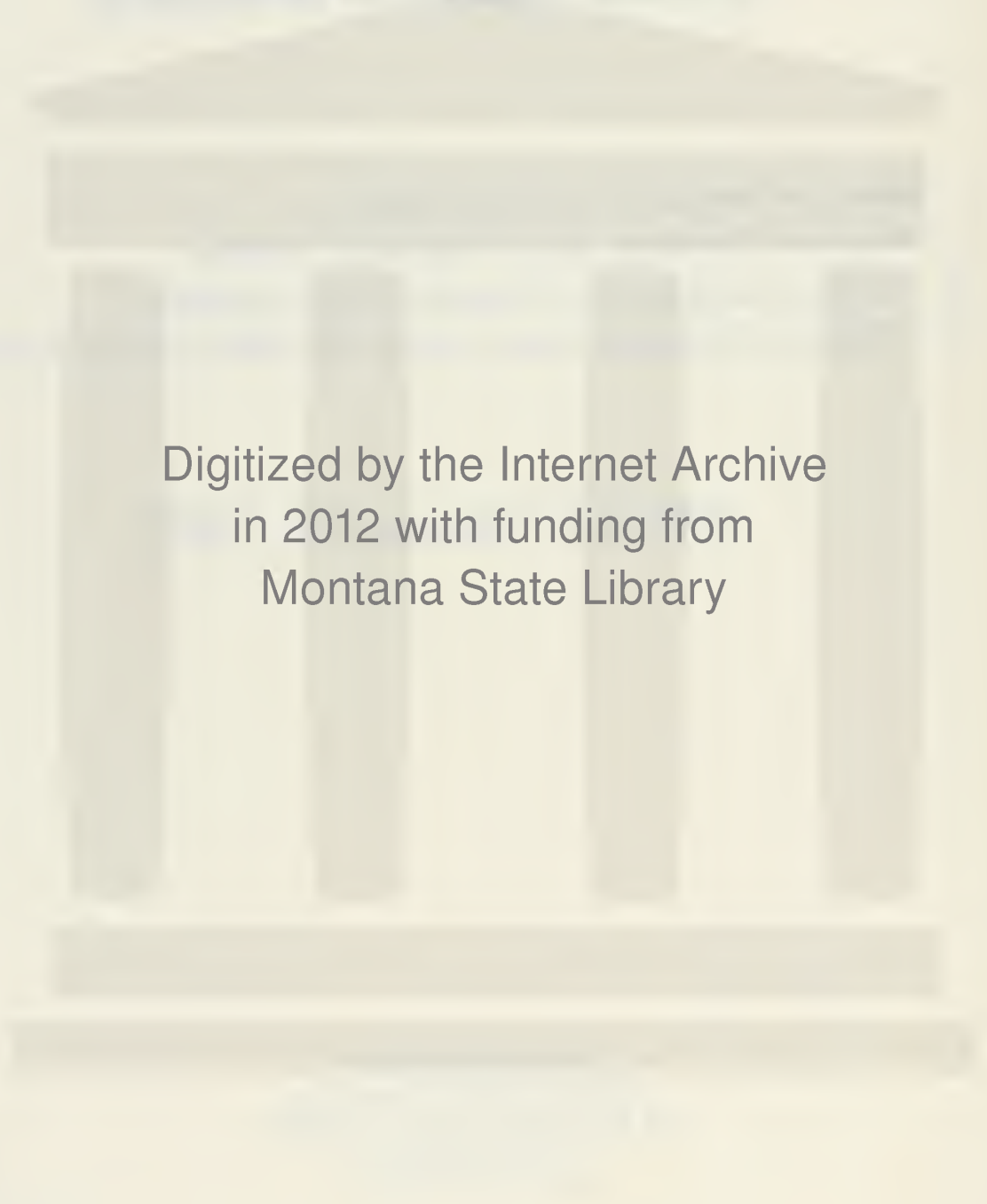
Minimum Standards for School Buses in Montana

I. Minimum Standards for School Buses
II. Minimum Standards Special Education Vehicles
III. Minimum Standards LP Gas Motor Fuel Installation
IV. Minimum Standards School Use of Four-Wheel Drive Vehicles

Effective February 29, 1982

State of Montana
Office of Public Instruction
Ed Argenbright, Superintendent
State Capitol
Helena, MT 59620



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Preface

These minimum standards for school buses in Montana, the first printing since 1973, were developed in accordance with the provisions of Section 20-10-111, M.C.A. 1981 and were approved by the State Board of Public Education in February 1982. Our new standards are adopted in accordance with the 1980 National Minimum Standards for School Buses and either meet or exceed national standards (effective November 13, 1981).

Also note that we have included minimum standards for LP (liquified petroleum) motor fuel installation and for the use of four-wheel drive alternative vehicles (both effective February 26, 1982).

I would like to express my appreciation to the Montana Highway Patrol, the Pupil Transportation Safety Committee and the other agencies, organizations and companies who provided assistance in the development of these standards.

Ed Argenbright
Superintendent of Public Instruction

FS14382

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Minimum Standards for School Buses

Introduction

These minimum standards are intended to apply primarily to new vehicles, including all types of school buses as defined below. ***It should be noted that vehicles with a capacity for less than ten (10) passengers cannot be certified as school buses under federal regulations.***

Definitions

1. A school bus is defined in section 61-1-116, MCA, as "every motor vehicle owned by a public or governmental agency and operated for the transportation of children to or from school or privately owned and operated for compensation for the transportation of children to or from the school."

   But for certain noted exceptions, the minimum standards which follow apply to all types of school buses:

   A Type "A" school bus is a conversion or body constructed upon a van-type compact truck or a front-section vehicle, with a gross weight rating of 10,000 pounds or less, designed for carrying more than 10 persons.

   A Type "B" school bus is a conversion or body constructed and installed upon a van or front section vehicle chassis, or stripped chassis, with a vehicle weight rating of more than 10,000 pounds, designed for carrying more than 10 persons. Most of the engine is beneath and/or behind the windshield and beside the driver's seat. The entrance door is behind the front wheels.

   A Type "C" school bus is a body installed upon a flat back cowl chassis with a gross vehicle weight rating of more than 10,000 pounds, designed for carrying more than 10 persons. All of the engine is in front of the windshield and the entrance door is behind the front wheels.

   A Type "D" school bus is a body installed upon a chassis, with the engine mounted in the front, midship, or rear, with a gross vehicle weight rating of more than 10,000 pounds, designed for carrying more than 10 persons. The engine may be behind the windshield and beside the driver's seat; it may be at the rear of the bus, behind the rear wheels, or midship between the front and rear axles. The entrance door is ahead of the front wheels.

I. The Bus Chassis

Air Cleaner

1. The engine intake air cleaner shall be furnished and properly installed by the chassis manufacturer to meet engine specifications.

Axles

1. The front and rear ends including suspension assemblies shall have a gross vehicle weight rating at ground at least equal to that portion of the load as would be imposed by the chassis manufacturer's maximum gross vehicle weight rating.

Brakes

1. A braking system, including service brake and parking brake, shall be provided.

2. Buses using air or vacuum in the operation of the brake system shall be equipped with warning signals, readily audible and visible to the driver, that will give a continuous warning when the air pressure available in the system for braking is 60 psi (pounds per square inch) or less or the vacuum in the system available for braking is eight (8) inches of mercury or less. An illuminated gauge that will indicate to the driver the air pressure in pounds per square inch or the inches of mercury vacuum available for the operation of the brakes shall be provided.

    a. Vacuum-assist brake systems shall have a reservoir used exclusively for brakes that shall be adequate to ensure loss in vacuum at full stroke application of not more than 30 percent with the engine not running. Brake system on gas-powered engines shall include suitable and convenient connections for the installation of a separate vacuum reservoir.

    b. Any brake system dry reservoir shall be so safeguarded by a check valve or equivalent device, that in the event of failure or leakage in its connection to the source of compressed air or vacuum, the stored dry air or vacuum shall not be depleted by the leakage or failure.

3. Buses using a hydraulic assist-booster in the operation of the brake system shall be equipped with warning signals, readily audible and visible to the driver, that will provide continuous warning in the event of a loss of fluid flow from primary source.

4. The brake lines and booster-assist lines shall be protected from excessive heat and vibration and be so installed as to prevent chafing.

Bumper, Front

1. Front bumper shall be furnished by chassis manufacturer as part of chassis.

2. Front bumper shall extend beyond forward-most part of the body, grille, hood, and fenders and shall extend to outer edges of fenders at bumper top line.

3. Front bumper, except breakaway bumper ends shall be of sufficient strength to permit pushing a vehicle of equal gross vehicle weight without permanent distortion to bumper, chassis, or body.

    Exceptions: Transit (Type D) front bumpers shall be furnished by body manufacturer.

Certification

1. Chassis manufacturer will, upon request, certify to the state agency having pupil transportation jurisdiction that their product meets minimum standards on items not covered by certification issued under requirements of the National Traffic and Motor Vehicle Safety Act.

Clutch

1. Clutch torque capacity shall be equal to or greater than the engine torque output.

Color

1. Chassis, including wheels and front bumper, shall be black. Hood, cowl, and fenders shall be in National School Bus Yellow. (See Appendix A.)

   Exception: Hood may be painted low-luster National School Bus Yellow.

Drive Shaft

1. Drive shaft shall be protected by metal guard or guards around the circumference end of the drive shaft to reduce the possibility of it whipping through floor or dropping to the ground if broken.

Electrical System

1. Battery

   a. Storage battery shall have a minimum cold cranking capacity rating equal to the cranking current required for 30 seconds at 0° Farenheit (-17.8 c) and a minimum reserve capacity rating of 120 minutes at 25 amp. Higher capacities may be required dependent upon optional equipment and local environmental conditions.

   b. When a battery is to be mounted by the body manufacturer on a sliding tray as opposed to the standard installation provided by the chassis manufacturer, the battery shall be temporarily mounted on the chassis frame by the chassis manufacturer. In this case the final location of the battery and the appropriate cable lengths shall be according to the SBMI Design Objectives Booklet, 1980 edition. (See Appendix B.)

2. Generator or Alternator

   a. Type A bus shall have a minimum 60 ampere per hour alternator.

   b. Type B bus shall have a minimum 80 ampere per hour alternator.

   c. Type C and D buses shall have a generator or alternator with a minimum rating of at least 80 amperes (in accordance with Society of Automotive Engineers rating) with minimum charging of 30 amperes at manufacturer's recommended engine idle speed (12 volt system), and shall be ventilated and voltage-controlled and, if necessary, current controlled. (See Appendix C.)

   d. Type A, B, C, and D buses, equipped with an electrical power lift, shall have a minimum of 100 ampere per hour alternator.

   e. Direct-drive generator or alternator is permissible in lieu of belt drive. Belt drive shall be capable of handling the rated capacity of the generator or alternator with no detrimental effect on other drive components.

   f. Refer to SBMI Design Objectives, May 1980 edition, for estimating required generator or alternator capacity. (See Appendix B.)

3. Wiring

   a. All wiring shall conform to current applicable recommended practices of the Society of Automotive Engineers. (See Appendix C.)

   b. All wiring shall use a standard color and/or number coding and each chassis shall be delivered with a wiring diagram that coincides with the wiring of the chassis.

c. Chassis manufacturer shall install a readily accessible terminal strip or plug on the body side of the cowl, or at accessible location in engine compartment of vehicles designed without a cowl, that shall contain the following terminals for the body connections:
   (1) main 100 amp body circuit
   (2) tail lamps
   (3) right turn signal
   (4) left turn signal
   (5) stop lamps
   (6) back up lamps
   (7) instrument panel lights (rheostat controlled by headlamp switch).

Exhaust System

1. Exhaust pipe, muffler, and tailpipe shall be outside bus body compartment and attached to chassis. Entire system shall be free of leaks.

2. Tailpipe shall be constructed of a corrosion-resistant tubing at least equal in strength and durability to 16-gauge steel.

3. Tailpipe shall:

   a. Extend beyond rear axle and shall extend at least five inches beyond chassis frame and be mounted outside of chassis frame rail at end point, or

   b. Shall extend to, but not beyond the body limits on the left side of the bus, behind the driver's compartment.

   Exception: The exhaust system on vehicles designed for the transportation of special education pupils shall be routed to the left of the right frame rail to allow for the installation of a lift on the right side of the vehicle.

4. Exhaust system on gas-powered chassis shall be properly insulated from fuel tank connections by a securely attached metal shield at any point where it is 12 inches or less from tank or tank connections.

5. Muffler shall be constructed of corrosion-resistant material.

Fenders, Front (for Type C vehicles)

1. The total spread of outer edges of front fenders, measured at fender line, shall exceed total spread of front tires when front wheels are in straightahead position.

2. Front fenders shall be properly braced and free from any body attachments.

   Exception: Standard not applicable to Types A, B, and D vehicles.

Frame

1. Frame or equivalent shall be of such design as to correspond at least to standard practice for trucks of same general load characteristics which are used for highway service.

2. Any secondary manufacturer that modifies the original chassis frame shall guarantee the performance of workmanship and materials resulting from such modification.

3. Any frame modification shall not be for the purpose of extending the wheelbase.

4. Holes in top or bottom flanges of frame side rail shall not be permitted except as provided in original chassis frame. There shall be no welding to frame side rails except by chassis or body manufacturer.

5. Frame lengths shall be provided in accordance with SMBI Design Objectives, May 1980 edition. (See Appendix B.)

6. There shall be no trailer hitches, ball or pin type, attached to buses.

Fuel Tank

1. Fuel tank or tanks of minimum capacity of 30 gallons with a 25 gallon actual draw shall be provided by the chassis manufacturer. It/they shall be filled and vented to the outside of the body, the location of which shall be so that accidental fuel spillage will not drip or drain on any part of the exhaust system.

2. No portion of the fuel system which is located to the rear of the engine compartment, except the filler tube, shall extend above the top of the chassis frame rail. Fuel lines shall be mounted to obtain maximum possible protection from the chassis frame.

3. Fuel filter with replaceable element shall be installed between fuel tank and engine.

4. Fuel tank installation shall be in accordance with SBMI Design Objectives, May 1980 edition. (See Appendix B.)

5. If a tank size other than 30 gallon is supplied, location of front of tank and filler spout must remain as specified by SBMI Design Objectives, May 1980 edition. (See Appendix B.)

   Exception: On vehicles constructed for transporting handicapped pupils, the fuel tank may be mounted on left chassis rail or behind rear wheels.

6. Auxiliary tank may be added, in accordance with SBMI Design Objectives, May 1980 edition. (See Appendix B.)

Governor

1. An engine governor is permissible. However, when it is desired to limit road speed, road speed governor should be installed.

2. When engine is remotely located from driver, governor shall be installed to limit engine speed to maximum revolutions per minute recommended by engine manufacturer, or tachometer shall be installed so engine speed may be known to driver.

Heating System, Provision for

1. The engine shall have openings for the purpose of supplying hot water for the bus heating system. The opening shall be suitable for attaching a 3/4 inch pipe thread/hose connector. The engine shall be capable of supplying water, have a temperature of at least 170° F at a flow rate of 50 pounds per minute at the return end of 30 feet of one inch inside diameter automotive hot water heater hose. (SBMI Standard No. 001—Heating and Ventilating Equipment, May 1980 edition—see Appendix B.)

Horn

1. Bus shall be equipped with horn or horns of standard make, each horn capable of producing complex sound in band of audiofrequencies between approximately 250 and 2,000 cycles per second and tested per Society of Automotive Engineers standard J-377. (See Appendix C.)

2. Must be audible for 200 feet.

Instruments and Instrument Panel

1. Chassis shall be equipped with the following instruments and gauges (lights in lieu of gauges are not acceptable except as noted):

   a. Speedometer.

   b. Odometer which will give accrued mileage including tenths of miles.

c. Voltmeter.
   (1) Ammeter with graduated charge and discharge with ammeter and its wiring compatible with generating capacities is permitted in lieu of voltmeter.

d. Oil-pressure gauge.

e. Water-temperature gauge.

f. Fuel gauge.

g. Upper beam headlight indicator.

h. Brake indicator gauge (vacuum or air)—light indicator in lieu of gauge permitted on a vehicle equipped with hydraulic-over-hydraulic brake system.

i. Turn signal indicator.

j. Automatic transmission selector.

2. All instruments shall be easily accessible for maintenance and repair.

3. Above instruments and gauges shall be mounted on instrument panel in such manner that each is clearly visible to driver in normal seated position in accordance with SBMI Design Objectives, May 1980 edition. (See Appendix B.)

4. Instrument panel shall have lamps of sufficient candlepower to illuminate all instruments and gauges and shift selector indicator for automatic transmission.

Oil Filter

1. Oil filter of replaceable element or cartridge type shall be provided and shall be connected by flexible oil lines if it is not of built-in or engine-mounted design. Oil filter shall have capacity of approximately one (1) quart.

Openings

1. All openings in floorboard or firewall between chassis and passenger-carrying compartment, such as for gearshift lever and parking brake lever, shall be sealed.

Passenger Load

1. Gross vehicle weight (GVW) is the sum of the chassis weight, plus body weight, plus the driver's weight, plus total seated pupil weight.

   a. For purposes of calculation, the driver's weight is 150 pounds.

   b. For purposes of calculation, the pupil weight is 120 pounds.

2. Actual Gross Vehicle Weight (GVW) shall not exceed the chassis manufacturer's gross vehicle weight rating (GVWR) for the chassis.

3. Manufacturer's gross vehicle weight rating shall be furnished in duplicate (unless more are requested) by manufacturer to the state agency having pupil transportation jurisdiction. The Superintendent of Public Instruction shall, in turn, transmit such ratings to each other state agency responsible for development or enforcement of state standards for school buses.

Power and Gradeability

1. Gross Vehicle Weight (GVW) shall not exceed 185 pounds per net published horsepower of the engine at the manufacturer's recommended maximum number of revolutions per minute.

Shock Absorbers

1. Bus shall be equipped with front and rear double-acting shock absorbers compatible with manufacturer's rated axle capacity at each wheel location.

Springs

1. Capacity of springs or suspension assemblies shall be commensurate with chassis manufacturer's gross vehicle weight rating.

2. If rear springs are used, they shall be of progressive type.

Steering Gear

1. Steering gear shall be approved by chassis manufacturer and designed to assure safe and accurate performance when vehicle is operated with maximum load and at maximum speed.

2. Steering mechanism shall provide for easy adjustment for lost motion.

3. No changes shall be made in steering apparatus which are not approved by chassis manufacturer.

4. There shall be clearance of at least two inches between steering wheel and cowl instrument panel, windshield, or any other surface.

5. Power steering is optional.

6. The steering system shall be designed to provide for means for lubrication of all wear-points.

Tires and Rims

1. Tires and rims of proper size and tires with load rating commensurate with chassis manufacturer's gross vehicle weight rating shall be provided.

2. Dual rear tires shall be provided on Type B, Type C, and Type D school buses.

3. All tires on any given vehicle shall be of same size and ply rating.

4. If vehicle is equipped with spare tire and rim assembly, it shall be of the same size as those mounted on the vehicle.

5. Spare tire except in fleets where a service truck is maintained and where the buses operate within the city limits or are equipped with two-way radio shall be suitably mounted in accessible location outside passenger compartment.

6. Tread depth 4/32'' on front and 2/32'' on rear will be minimum.

7. No spare shall be located inside the bus.

   Exception: Type A Bus—must be securely fastened.

Tow Eyes or Hooks

1. Tow eyes or hooks shall be furnished, front and rear, and attached so as not to project beyond the front or rear bumpers. Tow eyes or hooks attached to the bumpers (chassis) shall be furnished by chassis manufacturer.

Transmission

1. When automatic or semi-automatic transmission is used, it shall provide for not less than three forward speeds and one reverse speed.

2. When manual transmission is used, second gear and higher shall be synchronized except when incompatible with engine power. A minimum of three forward speeds and one reverse speed must be provided.

Turning Radius

1. Chassis with a wheel base of 264 inches or less shall have a right and left turning radius of not more than 42½ feet, curb to curb measurement.

2. Chassis with a wheel base of 265 inches or more shall have a right and left turning radius of not more than 44½ feet, curb to curb measurement.

Undercoating

1. Chassis manufacturer shall coat undersides of front fenders with compound to prevent rust which meets or exceeds federal specification TT-C-520a using modified test procedures as outlined in undercoating section of Body Standards, page 18.

Weight Distribution

1. Weight distribution of fully loaded bus on level surface shall be such so as not to exceed the manufacturer's front Gross Axle Weight Rating and rear Gross Axle Weight Rating.

Aisle

1. Minimum clearance of all aisles shall be 12 inches.

   Exception: Type A vehicle.

2. The seat backs shall be slanted sufficiently to give aisle clearance of 15 inches at tops of seat backs.

Battery

1. Battery is to be furnished by chassis manufacturer.

2. When battery is mounted outside of engine compartment as described in Electrical System 1, battery of Chassis Standard, the body manufacturer shall securely attach battery on slide-out or swing-out tray in closed, vented compartment in the body skirt, whereby battery may be exposed to outside for convenient servicing. Battery compartment door or cover shall be secured by adequately and conveniently operated hinges at front or top and secured by adequately and conveniently operated latch or other type fastener.

Book Racks

1. Book racks, if installed, shall be provided above side windows within range from front cross-seat to rear transverse seat except across or above emergency door.

2. Racks shall be free of projections and must have a padded perimeter.

Bumpers

1. Rear bumper shall be of pressed steel channel or equivalent material at least 3/16 inch thick and 8 inches wide (high), and of sufficient strength to permit pushing by another vehicle without permanent distortion.

2. Rear bumper shall be wrapped around back corners of bus. It shall extend forward at least 12 inches, measured from rear-most point of body at floor line.

3. Rear bumper shall be attached to chassis frame in such manner that it may be easily removed, shall be so braced as to develop full strength of bumper section from rear or side impact, and shall be so attached as to prevent hitching of rides.

4. Rear bumper shall extend at least one inch beyond rear-most part of body surface measured at floor line.

   Exception: Type A vehicles.

5. Front bumper shall be furnished by chassis manufacturer as part of chassis.

6. Front bumper shall extend beyond forward-most part of the body, grille, hood, and fenders and shall extend to outer edges of fenders at bumper top line.

7. Front bumper, except breakaway bumper ends shall be of sufficient strength to permit pushing a vehicle of equal gross vehicle weight without permanent distortion to bumper, chassis, or body.

   Exceptions: Transit (Type D) front bumpers shall be furnished by body manufacturer.

Ceiling

See Inside Height, Insulation, and Interior, page 13.

Color

1. School bus body shall be painted uniform color, National School Bus Yellow.

2. The body exterior paint, trim, bumper, lamp hoods (if any), emergency door arrow, and lettering shall be black. As an alternative, the rear bumper may be covered with reflective material. The color known as National School Bus Yellow was designated as such by the 1939 National Conference on School Bus Standards. The National Bureau of Standards of the U.S. Department of Commerce assisted in developing this color and its colorimetric specifications. (See Appendix A.)

Construction

1. Construction shall be of prime commercial quality steel or other metal or material with strength at least equivalent to all-steel as certified by bus body manufacturer.

2. Construction shall provide reasonably dustproof and watertight unit.

Defrosters

1. Defrosting and defogging equipment shall direct a sufficient flow of heated air onto the windshield, the window to the left of the driver and the glass in the viewing area directly to the right of the driver to reduce the amount of frost, fog and snow. The defroster unit shall have a separate blower motor in addition to the heater motors.

   Exception: Type A vehicles.

2. The defrosting system shall conform to Society of Automotive Engineers Standards J-381 and 382. (See Appendix C.)

3. The defroster and defogging system shall be capable of furnishing heated outside ambient air except that part of the system furnishing additional air to the windshield, entrance door and step-wheel may be of the recirculating air type.

4. Auxiliary fans are not to be considered as a defrosting and defogging system.

5. Auxiliary fans—if used.

   a Auxiliary fan for the left side shall be placed in a location where it can be adjusted to its maximum effectiveness.

   b. Auxiliary fan for the right side shall be in a location where it can be adjusted to its maximum effectiveness.

   c. These fans shall be a nominal six-inch diameter.

   d. The blades of these fans shall be covered with a protective cage. Each of these fans shall be controlled by a separate switch.

Doors

1. Service Doors

   a. Service door shall be under control of driver, and designed so as to afford easy release and prevent accidental opening. When hand lever is used, no part shall come together so as to shear or crush fingers.

   b. Service door shall be located on right side of bus opposite driver and within direct view of driver.

c. Service door shall have minimum horizontal opening of 24 inches and minimum vertical opening of 68 inches.

Exception: Type A vehicles.

d. Service door shall be of split type, sedan type, or jackknife type. (Split-type door includes any sectioned door which divides and opens inward or outward.) If one section of split-type door opens inward and other opens outward, front section shall open outward.

e. Lower as well as upper panels shall be of approved safety glass. Bottom of lower glass panel shall not be more than 35 inches from ground when bus is unloaded. Top of upper glass panel shall not be more than six inches from top of door.

Exception: Type A vehicles.

f. Vertical closing edges shall be equipped with flexible material to protect children's fingers.

Exception: Type A vehicles.

g. There shall be no door to left of driver.

Exception: Type A vehicles.

h. All doors shall be equipped with a padding at the top edge of each door opening. Pad shall be at least three inches wide and one inch thick and extend the full width of the door opening.

2. Emergency Door

a. Emergency door shall be hinged on right side if in rear end of bus and on front side if on left side of bus. It shall open outward and shall be labeled inside to indicate how it is opened.

Exception: Types A and B vehicles.

b. Upper portion of emergency door shall be equipped with approved safety glazing, exposed area of which shall be not less than 400 square inches.

c. There shall be no steps leading to emergency door.

d. Words "EMERGENCY DOOR," both inside and outside in letters at least two inches high, shall be placed at top of or directly above the emergency door or on the door in the metal panel above the top glass.

Fire Extinguisher

1. Bus shall be equipped with at least one pressurized, dry chemical type fire extinguisher of at least 5-pound capacity, mounted in a bracket, and located in driver's compartment in full view of and readily accessible to driver. A pressure gauge shall be mounted on the extinguisher as to be easily read without removing the extinguisher from its mounted position.

2. The fire extinguisher shall be of a type approved by the Underwriters Laboratories, Inc. (207 East Ohio Street, Chicago, Illinois 60611), with a total rating of not less than 2 A-10 BC. The operating mechanism shall be sealed with a type of seal which will not interfere with the use of the fire extinguisher.

First Aid Kit

1. Bus shall carry removable metal first aid kit container mounted in accessible place within driver's compartment. Compartment shall be marked to indicate its location.

2. Contents of first aid kit: (24 units)

a.	Adhesive tape—1'' x 2½ yd., 1 per pkg.	2 pkg.
b.	Absorbent gauze compress, 1 per pkg.	3 pkg.
c.	Compress bandages 4'', 1 per pkg.	4 pkg.
d.	Compress bandages 2'', 4 per pkg.	4 pkg.
e.	Gauze roller bandage 4'' x 6 yd., 1 per pkg.	1 pkg.
f.	Gauze roller bandage 2'' x 6 yd., 2 per pkg.	1 pkg.
g.	Scissors—pair	1 pr.
h.	Triangular bandage 40'', 1 per pkg.	4 pkg.
i.	Waterproof adhesive bandages, 1'' (band-aids), 10 per pkg	3 pkg.
j.	Wire splint or plastic inflatable, 1 per pkg.	1 pkg.
	Total	24 pkg.

Floor Covering

1. Floor in underseat area, including tops of wheel housings, driver's compartment and toeboard, shall be covered with rubber floor coverings or equivalent having minimum overall thickness of .125 inch.

2. Floor covering in aisle shall be of aisle-type rubber or equivalent, wear-resistant, and ribbed. Minimum overall thickness shall be .187 inch measured from tops of ribs.

3. Floor covering must be permanently bonded to floor and must not crack when subjected to sudden changes in temperature. Bonding or adhesive material shall be waterproof and shall be of type recommended by manufacturer of floor-covering material. All seams must be sealed with waterproof sealer.

Heaters

1. Heaters shall be of hot-water or combustion type.

2. If only one heater is used, it shall be of fresh-air or combination fresh-air and recirculating type.

3. If more than one heater is used, additional heaters shall be of recirculating air type.

4. The heating system shall be capable of maintaining throughout the bus temperature of not less than 40 degrees Farenheit at average minimum January temperature as established by the U.S. Department of Commerce, Weather Bureau, for the area in which the vehicle is to be operated.

5. All heaters installed by body manufacturers shall bear a name plate that shall indicate the heater rating in accordance with SBMI Code 011, with said plate to be affixed by the heater manufacturer which shall constitute certification that the heater performance is as shown on the plate. (See Appendix B.)

   Exception: Does not apply to vehicles not originally manufactured as school buses.

6. Heater hoses shall be adequately supported to guard against excessive wear due to vibration. The hoses shall not dangle or rub against the chassis or sharp edges and shall not interfere with or restrict the operation of any engine function. Heater hose shall conform to SAE J20c. Heater lines on the interior of bus shall be shielded to prevent scalding of the driver or passengers. (See Appendix C.)

7. Each hot water heater system shall include a shut-off valve installed in the pressure and return lines at the engine. There shall be a water flow regulating valve installed for convenient operation by the driver.

   Exception: Type A vehicles.

8. All combustion-type heaters shall be approved by Underwriters Laboratories, Inc.

9. Portable heaters may not be used.

Identification

1. Body shall bear words "SCHOOL BUS" in black letters at least eight inches high on both front and rear of body or on signs attached thereto. Lettering shall be placed as high as possible without impairment of its visibility. Lettering shall conform to "Series B" of Standard Alphabets for Highway Signs.

2. Only signs and lettering approved by state law or regulation, limited to name of owner or operator and any number necessary for identification, shall appear on sides of bus.

Inside Height

1. Inside body height shall be nominal 72 inches or more, measured metal to metal, at any point on longitudinal center line from front vertical bow to rear vertical bow.

   Exception: Type A and B vehicles (60 inches or more).

Insulation

1. Ceiling and walls shall be insulated with proper material to deaden sound and to reduce vibrations to a minimum. If thermal insulation is specified also, it shall be of fire-resistant material of type approved by Underwriters Laboratories, Inc.

2. Floor insulation is required. It shall be 5-ply at 5/8 inches thick and/or it shall equal or exceed properties of exterior-type softwood plywood, C D Grade as specified in standard issued by U.S Department of Commerce.

Interior

1. Interior of bus shall be free of all unnecessary projections likely to cause injury. This standard requires inner lining on ceilings and walls. If ceiling is constructed so as to contain lapped joints, forward panel shall be lapped by rear panel and exposed edges shall be beaded, hemmed, flanged, or otherwise treated to minimize sharp edges.

2. Ceilings over aisles shall be free of all projections.

Lamps and Signals

1. Lamps on exterior of vehicle are covered by Federal Motor Vehicle Safety Standard 108.

2. Interior lamps shall be provided which adequately illuminate aisle and step-well.

3. School bus alternately flashing signal lamps:

   Definition: School bus alternately flashing red signal lamps are mounted at same horizontally both front and rear, intended to identify a vehicle as a school bus and to inform other users of the road that such vehicle is stopped on roadway to take on or discharge school children.

Definition: School bus amber signal lamps are alternately flashing lamps mounted horizontally both front and rear, intended to identify a vehicle as a school bus and to inform other users of the roadway that such vehicle is about to stop on roadway to take on or discharge school children.

a. Bus shall be equipped with two red lamps at rear of vehicle and two red lamps at front of vehicle.

b. In addition to four red lamps described in (a) above, four amber lamps shall be installed as follows: one amber lamp shall be located near each red signal lamp, at same level, but closer to vertical centerline of bus; system of red and amber signal lamps shall be wired so that amber lamps are energized manually, and red lamps are automatically energized (with amber lamps being automatically de-energized) when bus service door is opened.

c. Area around lens of each alternately flashing signal lamp and extending outward approximately three inches shall be painted black. In installations where there is no flat vertical portion of body immediately surrounding entire lens of lamp, circular or square band of black approximately three inches wide, immediately below and to both sides of lens, shall be painted on body or roof area against which signal lamp is seen (from distance of 500 feet along axis of vehicle).

d. All flashers for alternately flashing red and amber signal lamps shall be enclosed in the body in a readily accessible location.

4. Turn signal and stop lamps.

a. Bus body shall be equipped with rear turn signal lamps which are at least seven (7) inches in diameter and meet specifications of the Society of Automotive Engineers. These signals must be connected to the chassis hazard warning switch to cause simultaneous flashing of turn signal lamps when needed as vehicular traffic hazard warning. Turn signal lamps are to be placed as wide apart as practical and their centerline shall be approximately eight (8) inches below the rear windows.

Exception: Type A vehicle lamps must be 21 square inches in lens area.

b. Just inside the turn signal, there shall be installed at the same elevation, two seven (7) inch diameter stop lamps.

5. On all buses equipped with a monitor which monitors the front and rear lamps of the school bus, the monitor shall be mounted in full view of the driver. If the full circuit current passes through the monitor, each circuit shall be protected by a fuse or circuit breaker against any short circuit or intermittent shorts.

6. Strobe light (optional): A white flashing strobe light, when installed, is intended to increase the visibility of the school bus on the roadway during adverse weather conditions when loading and unloading children. It shall have a single clear lens emitting light 360° around its vertical axis. It shall be located on the longitudinal center line of the bus roof approximately 1/3 to 1/2 of the distance forward from the rear of the bus. It shall be controlled by a manual switch located in the instrument panel to the left of the driver. A pilot light shall indicate to the driver that the light is turned on.

7. Warning Device: Each school bus shall contain at least three (3) reflectorized triangle road warning devices mounted in an accessible place.

Metal Treatment

1. All metal used in construction of bus body shall be zinc- or aluminum-coated or treated by equivalent process before bus is constructed. (Included are such items as structural members, inside and outside panels, floor panels and floor sills; excluded are door handles, grab handles, stanchions, interior decorative parts, and other interior plated parts.)

2. All metal parts that will be painted shall be (in addition to above requirements) chemically cleaned, etched, zinc-phosphate-coated, and zinc-chromate or epoxy-primed or conditioned by equivalent process.

3. In providing for these requirements, particular attention shall be given to lapped surfaces, welded connections of structural members, cut edges, punched or drilled hole areas in sheet metal, closed or box sections, unvented or undrained areas, and surfaces subjected to abrasion during vehicle operation.

4. As evidence that above requirements have been met, samples of materials and sections used in construction of bus body, when subjected to 1,000-hour salt spray test as provided for in latest revision of ASTM Designation: B 117, "Standard Method of Salt Spray (Fog) Testing," shall not lose more than 10 percent of material by weight.

Mirrors

1. Interior mirror: Shall be either clear view laminated glass or clear view glass bonded to a backing which retains the glass in the event of breakage. Mirror shall be a minimum of 6" x 30". Mirror shall have rounded corners and protected edges.

2. Exterior mirrors: One exterior left side and one exterior right side rear view mirror with a minimum of 50 square inches each of flat mirror glass.

   Exception: Type A and B vehicles shall be manufacturer's standard.

3. Each bus shall have a minimum of one exterior right side convex mirror with a minimum of 35 square inches to provide localized vision on the right side of the bus.

4. Cross-over vision mirrors (right and left): when a rod 30 inches is placed upright on the ground at any point along a traverse line one foot forward of the forward-most point of a school bus and extending the width of the bus; at least 7½" of the length of the rod shall be visible to the driver, either by direct view or by means of an indirect visibility system.

Mounting

1. Chassis frame shall extend to rear edge of rear body cross member. Bus body shall be attached to chassis frame in such manner as to prevent shifting or separation of body from chassis under severe operating conditions.

2. Body front shall be attached and sealed to chassis cowl in such manner as to prevent entry of water, dust, and fumes through joint between chassis cowl and body.

3. Insulating material shall be placed at all contact points between body and chassis frame. Insulating material shall be approximately 1/4 inch thick, shall have quality of sidewall of automobile tire, and shall be so attached to chassis frame or body member that it will not move under severe operating conditions.

Overall Length

1. Overall length of bus shall not exceed 40 feet.

Overall Width

1. Overall width of bus shall not exceed 96 inches excluding accessories.

Rub Rails

1. There shall be one rub rail located on each side of bus approximately at seat level which shall extend from rear side of entrance door completely around bus body (except for emergency door) to point of curvature near outside cowl on left side.

2. There shall be one rub rail located approximately at floor line which shall cover same longitudinal area as upper rub rail, except at wheel housings, and shall extend only to radii of right and left rear corners.

3. Both rub rails shall be attached at each body post and all other upright structural members.

4. Both rub rails shall be four inches or more in width, shall be of 16-gauge steel or suitable material of equivalent strength, and shall be constructed in corrugated or ribbed fashion.

5. Both rub rails shall be applied outside body or outside body posts. Pressed-in or snap-on rub rails do not satisfy this requirement.

   Exception: For Type A and B vehicles using chassis manufacturer's body, or Type C and D buses using rear luggage or rear engine compartment, rub rails need not extend around rear corners.

Sanders

1. Where required or used, sanders shall:

   a. be of hopper cartridge valve type.

   b. have metal hopper with all interior surfaces treated to prevent condensation of moisture.

   c. be of at least 100-pound (grit) capacity.

   d. have cover on filler opening of hopper, which screws into place, sealing unit airtight.

   e. have discharge tubes extending to front of each rear wheel under fender.

   f. have no-clogging discharge tubes with slush-proof, non-freezing rubber nozzles.

   g. be operated by electric switch with telltale light mounted on instrument panel.

   h. be exclusively driver-controlled.

   i. have gauge to indicate hoppers need refilling when they are down to one-quarter full.

Seat Belt for Driver

1. Seat belt for driver shall be provided. Belt shall be equipped with retractor on each side of sufficient quality and strength to keep it retracted and off floor when not in use.

Seats and Crash Barriers

1. All seats shall have minimum depth of 15 inches.

2. In determining seating capacity of bus, allowable average rump width shall be:

   a. 13 inches where 3-3 seating is used, and

   b. 15 inches where 3-2 seating plan is used.

3. Seat, seat back cushion and crash barrier shall be covered with a material having 42-ounce finished weight, 54 inches width, and finished vinyl coating of 1.06 broken twill, or other material with equal tensile strength, tear strength, seam strength, adhesion strength, resistance to abrasion, resistance to cold, and flex separation.

Steps

1. First step at service door shall be not less than 12 inches and not more than 16 inches from ground, based on standard chassis specifications.

2. Service door entrance may be equipped with two-step or three-step step-well. Risers in each case shall be approximately equal. When plywood floor is used on steel, differential may be increased by thickness of plywood used.

3. Steps shall be enclosed to prevent accumulation of ice and snow.

4. Steps shall not protrude beyond side body line.

5. Grab handle not less than 10 inches in length shall be provided in unobstructed location inside doorway.

   Exception: Type A and B vehicles. Steps (if any) not manufactured originally as school bus may be manufacturer's standard.

Step Treads

1. All steps, including floor line platform area, shall be covered with 3/16 inch rubber floor covering or other materials equal in wear resistance and abrasion resistance to top grade rubber.

2. Metal back of tread, minimum 24-gauge cold roll steel, shall be permanently bonded to ribbed rubber; grooved design shall be such that said grooves run at 90 degree angle to long dimension of step tread.

3. 3/16-inch ribbed step tread shall have a 1½ inch white nosing as integral piece without any joint.

4. Rubber portion of step treads shall have the following characteristics:

   a. Special compounding for good abrasion resistance and high coefficient of friction.

   b. Flexibility so that it can be bent around a ½ inch mandrel both at 130° F and 20° F without breaking, cracking, or crazing.

   c. Show a durometer hardness 85 to 95.

Stirrup Steps

1. There shall be at least one folding stirrup step or recessed foothold and suitably located handles on each side of the front of the body for easy accessibility for cleaning the windshield and lamps except when windshield and lamps are easily accessible from the ground. Standard does not apply to vehicles not originally manufactured as school buses. A step, in lieu of the stirrupsteps, is permitted in or on the front bumper.

Storage Compartment

1. If tools, tire chains and/or tow chains are carried on the bus, a container of adequate strength and capacity may be provided. Such storage container may be located either inside or outside the passenger compartment but, if inside, it shall have cover (seat cushion may not serve for this purpose) capable of being securely latched and be fastened to the floor convenient to either the service or emergency door.

Sun Shield

1. Interior adjustable transparent sun shield not less than 6'' x 30'' with a finished edge shall be installed in a position convenient for use by driver.

   Exception: Type A and B vehicles.

Undercoating

1. Entire underside of bus body, including floor board sections, cross members, and below floor line side panels shall be coated with rust-proofing compound for which compound manufacturer has issued notarized certification of compliance to bus body builder that compound meets or exceeds all performance requirements of federal specification TT-C-520a, using modified test procedures (test panels are to be prepared in accordance with paragraph 4.6.12 of TT-C-520a with modified procedure requiring that tests be made on a 48-hour air cured film at thickness recommended by compound manufacturer) for following requirements: (See Appendix D.)

   a. Salt spray resistance—pass test modified to 5 percent salt and 1,000 hours.

   b. Abrasion resistance—pass.

   c. Fire resistance—pass.

2. Undercoating compound shall be applied with suitable airless or conventional spray equipment to recommend film thickness and shall show no evidence of voids in cured film.

Ventilation

1. Body shall be equipped with suitable, controlled ventilating system of sufficient capacity to maintain proper quantity of air under operating conditions without opening of windows except in extremely warm weather.

2. Static-type non-closable exhaust ventilation shall be installed in low-pressure area of roof.

   Exception: Type A and B vehicles.

Wheel Housings

1. Wheel house openings shall allow for easy tire removal and service.

2. Wheel housing shall be attached to floor sheets in such a manner to prevent any dust, water, or fumes from entering the body. Wheel housing shall be constructed of 16-gauge steel, or other material of equal strength.

3. Inside height of wheel housings above floor line shall not exceed 12 inches.

4. The wheel housing shall provide clearance for installation and use of tire chains on single and dual (if so equipped) power-driving wheels.

5. No part of a raised wheel housing shall extend into the emergency door opening.

   Exception: Type A and B vehicles.

Windshield and Windows

1. All glass in windshield, windows, and doors shall be of approved safety glass so mounted that permanent mark is visible, and of sufficient quality to prevent distortion of view in any direction.

   Exception: Ridged plastic glazing may not be used in windshield and windows to the immediate right and left of the driver, but may be used in all other windows.

2. Glass in windshield may be heat-absorbing and may contain a shaded band across top. Location of "fade out" shall be above upper limit for minimum visibility.

3. Each full side window shall provide unobstructed emergency opening at least nine inches high and 22 inches wide, obtained by lowering of window.

4. Knockout-type, split-sash windows may be used.

Windshield Washers

1. A windshield washer system shall be provided.

Windshield Wipers

1. A windshield wiping system, two-speed or more, shall be provided.

2. The wipers shall be operated by one or more air or electric motors of sufficient power to operate wipers. If one motor is used, the wipers shall work in tandem to give full sweep of windshield.

Wiring

1. All wiring shall conform to current standards of Society of Automotive Engineers. (See Appendix C.)

2. Wiring shall be arranged in circuits as required with each circuit protected by a fuse or circuit breaker. A system of color and/or number coding shall be used.

3. Wiring shall be arranged in at least six regular circuits, as follows:

   a. Head, tail, stop (brake), and instrument panel lamps

   b. Clearance and step-well lamps (step-well lamp shall be actuated when service door is opened)

   c. Dome lamp

   d. Ignition and emergency door signal

   e. Turn signal lamps

   f. Alternately flashing signal lamps

4. Any of the above combination circuits may be subdivided into additional independent circuits.

5. Whenever heaters and defrosters are used, at least one additional circuit shall be installed.

6. Whenever possible, all other electrical functions (such as sanders and electric-type windshield wipers) shall be provided with independent and properly protected circuits.

7. Each body circuit shall be coded by number or letter on a diagram of circuits and shall be attached to the body in readily accessible location.

8. The entire electrical system of the body shall be designed for the same voltage as the chassis on which the body is mounted.

9. All wiring shall have an amperage capacity equal to or exceeding the designed load. All wiring splices to be done at an accessible location and noted as splices on wiring diagram.

10. A body wiring diagram of easy readable size shall be furnished with each bus body or affixed in an area convenient to the electrical accessory control panel.

11. Body power wire shall be attached to special terminal on the chassis.

12. All wires passing through metal openings shall be protected by a grommet.

13. Wires not enclosed within body shall be fastened securely at intervals of not more than 18 inches. All joints shall be soldered or jointed by equally effective connectors.

Changes

1. No changes shall be made in the construction of a vehicle used for the transportation of school children which are not approved by the Montana Board of Public Education, by and with the advice of the chief of the Montana State Highway Patrol and the Superintendent of Public Instruction.

APPENDIXES

A. **National School Bus Yellow**

C.I.E. Chromaticity Coordinates		Daylight Reflectance Y(%)			Dominant Wavelength (in millicrons)			Excitation Purity P (%)		
X		max.	std.	min.	max.	std.	min.	max.	std.	min.
.5211	.4549	—	41.	40.	584.5	583.5	582.5	—	93.7	89.0

At the 1980 Conference the colors in use were reviewed. A color standard was selected, slightly different from the above, and specific tolerances were chosen. These tolerances will insure a continuity of appearance from bus to bus, and within the same bus when different elements are finished or refinished at different times. Specification for the Standard Color, with light and dark tolerances (upper and lower reflectances) are shown below in tabular form:

For Source C

C.I.E. Chromaticity Coordinates		Reflectance Y (%)	Reflectance Tolerances	
x	y		Upper	Lower
.5089	.4408	40.14%	41.77%	38.45%

B. **School Bus Manufacturers Institute (SBMI)**
Division of Truck and Body Equipment Association
Suite 1220
5530 Wisconsin Avenue
Washington, D.C. 20015
Phone: (301) 652-8004

C. **Society of Automotive Engineers, Inc. (SAE)**
400 Commonwealth Drive
Warrendale, PA 15096
Phone: (412) 776-4841

D. **Federal Specification TT-C-520a**
General Services Administration
Specification and Consumer Information Distribution Center
Washington Navy Yard
Building 197
Washington, D.C. 20407

E. **Underwriters Laboratories, Inc.**
333 Pfingsten Road
Northbrook, IL 60062
Phone: (312) 272-8800

F. **Product Standard PSI-66**
U.S. Department of Commerce
14th and E Streets
Washington, D.C. 20230

G. **American Society for Testing and Materials**
1916 Race Street
Philadelphia, PA 19103

Introduction to Special Education School Bus or MPV (Multipurpose Passenger Vehicles)

The specifications in this section are intended to be supplementary to specifications in the chassis and body sections. In general, special education buses should meet all the requirements of those preceding sections plus those listed in this section. Since it is recognized by the entire industry that the field of transportation for special education passengers is characterized by special needs for individual cases and by a rapidly emerging technology for meeting these needs, a flexible, common-sense approach to the adoption and enforcement of specifications for these vehicles is prudent.

By federal regulation, buses, including school buses, are defined as vehicles designed to carry ten or more passengers. Vehicles with less than ten passenger positions (including the driver) cannot be certified as buses. For this reason, the federal vehicle classification Multipurpose Passenger Vehicle, or MPV, must be used by manufacturers in some cases for these vehicles in lieu of the classification *School Bus*. In determining passenger capacity, wheelchair positions are counted as passenger positions. This classification system while requiring compliance with a different set of Federal Standards for *School Buses* does not preclude the use of National School Bus Yellow paint.

General Requirements

1. School buses designed for transporting children with special transportation needs shall comply with Montana Minimum Standards applicable to school buses. Because of the use of special equipment on these buses, certain modifications and/or exceptions in these standards shall be made, particularly in the bus body.

2. These standards address modifications as they pertain to school buses with a gross vehicle weight of ten thousand pounds or more and standard seating arrangement prior to modification that provides a capacity of ten or more children.

3. Any school bus that is used specifically for the transportation of children who are confined to a wheelchair and/or other mechanical restraining devices prohibiting their use of the regular service entrance, shall be equipped with a power lift.

4. Lift shall be located on the right side of the body, in no way attached to the exterior sides of the bus but confined within the perimeter of the school bus body when not extended.

Aisles

All aisles leading to the emergency door(s) from wheelchair area shall be of sufficient width (minimum thirty (30) inches) to permit passage of maximum size wheelchair.

Communications

All special education buses may be equipped with a two-way radio communication system.

Exhaust System

The exhaust system shall be routed to the left of the right frame rail to allow for the installation of a lift mechanism that would travel through the floor on the right side of the vehicle.

Fastening Devices

Positive fastening devices shall be provided and attached to the floor or walls or both to insure that occupied wheelchairs or any other occupied types of ambulatory devices can be securely fastened in position.

Glazing

Tinted glass may be installed in all doors, windows, and windshields. Tinted plastic may be installed in windows rear of driver's compartment.

Heaters

An additional heater(s) may be installed in the rear portion of the bus (behind the wheelwells).

Power Lift

1. Lifting mechanism shall be able to lift minimum pay load of six hundred (600) pounds.

2. When the platform is in the fully up position, it shall be locked in position mechanically by means other than a support, or lug in the door.

3. Controls shall be provided that enable the operator to activate the lift mechanism from either inside or outside of the bus. There shall be a means of preventing the lift platform from falling while in operation due to a power failure.

4. Power lifts shall be so equipped that they may be manually raised in the event of power failure of the power lift mechanism.

5. Lift travel shall allow the lift platform to rest securely on the ground.

6. All edges of the platform shall be designed to restrain wheelchair and operator's feet from being entangled during the raising and lowering process.

7. Platform shall be fitted on both sides and rear with full width shields (which extend above the floor line of the lift platform).

8. A restraining device shall be affixed to the outer edge (curb end) of the platform that will prohibit the wheelchair from rolling off the platform when the lift is in any position other than fully extended to ground level.

9. A self-adjusting, skid resistant plate shall be installed on the outer edge of the platform to minimize the incline from the lift platform to the ground level. This plate, if so designed, may also suffice as the restraining device described in item 8 above. The lift platform must be skid resistant.

10. A circuit breaker or fuse shall be installed between power source and lift motor if electrical power is used.

11. The lift mechanism shall be equipped with adjustable limit switches or by-pass valves to prevent excessive pressure from building in the hydraulic system when the platform reaches the full up position or full down position.

Regular Service Entrance

1. In type "C" and "D" vehicles, there shall be three (3) step risers, of equal height, in the entrance well.

2. An additional fold-out step may be provided which will provide for the step level to be no more than six (6) inches from the ground level.

Restraining Devices

Seat frames may be equipped with attachments or devices to which belts, restraining harnesses, or other devices may be attached.

Seating Arrangements

1. Flexibility in seat spacing to accommodate special devices shall be permitted due to the constant changing of passenger requirements.

Special Light

Lights shall be placed inside the bus to sufficiently illuminate lift area and shall be activated from door area.

Special Service Entrance

1. Bus bodies may have a special service entrance constructed in the body to accommodate a wheelchair lift for the loading and unloading of passengers.

2. The opening, to accommodate the special service entrance, shall be at any convenient point on the right (curb side) of the bus and far enough to the rear to prevent the door(s), when open, from obstructing the right front regular service door (excluding a regular front service door lift).

3. The opening may extend below the floor through the bottom of the body skirt. If such an opening is used, reinforcements shall be installed at the front and rear of the floor opening to support the floor and give the same strength as other floor openings.

4. The opening, with doors open, shall be of sufficient width to allow the passage of wheelchairs. The minimum clear opening shall be thirty (30) inches in width.

5. A drip moulding shall be installed above the opening to effectively divert water from entrance.

6. Entrance shall be of sufficient width and depth to accommodate various mechanical lifts and related accessories as well as the lifting platform.

7. Door posts and headers from entrance shall be reinforced sufficiently to provide support and strength equivalent to the areas of the side of the bus not used for service doors.

Special Service Entrance Doors

1. A single door may be used if the width of the door opening does not exceed forty (40) inches.

2. Two doors shall be used if any single door opening would have to exceed forty (40) inches.

3. All doors shall open outwardly.

4. All doors shall have positive fastening devices to hold doors in the open position.

5. All doors shall be weather sealed and on buses with double doors, they shall be so constructed that a flange on the forward door overlaps the edge of the rear door when closed.

    a. If optional power doors are installed the design shall permit release of the doors for opening and closing by the attendant from the platform inside the bus.

6. When manually operated dual doors are provided the rear door shall have at least a one-point fastening device to the header.

    a. The forward mounted door shall have at least three-point fastening devices. One shall be to the header, one to the floor line of the body, and the other shall be into the rear door.

    b. These locking devices shall afford maximum safety when the doors are in the closed position.

    c. The door and hinge mechanism shall be of a strength that will provide for the same type of use as that of a standard entrance door.

7. Door materials, panels, and structural strength shall be equivalent to the conventional service and emergency doors. Color, rub rail extensions, lettering and other exterior features shall match adjacent sections of the body.

8. Each door shall have windows set in rubber compatible within one-inch of the lower line of adjacent sash.

9. Door(s) shall be equipped with a device that will actuate a green flashing visible signal located in the driver's compartment when door(s) is not securely closed and ignition is in ''on'' position.

10. A switch shall be installed so that the lifting mechanism will not operate when the lift platform door(s) is closed.

Type ''A'' School Buses Used for Special Transportation

1. This section pertains to vehicles of more than ten (10) persons capacity but less than ten thousand (10,000) pounds in GVW.

2. These vehicles shall meet the specifications of all of the previous sectons.

   Execption: In lieu of a powered lift, a ramp device may be installed.

Minimum Standards
LP Gas Motor Fuel Installation for School Buses

General

1. The Board of Public Education hereby adopts and incorporates by reference Pamphlet No. 58, National Fire Protection Association, Inc., which sets forth the safety specifications for transfer of LP gas fuel tanks. A copy of Pamphlet No. 58 may be obtained from the National Fire Protection Association, Inc., 470 Atlantic Avenue, Boston, Massachusetts 02210.

2. LP gas motor fuel conversion equipment installed on public school buses is permitted. School districts converting school buses to LP gas carburetion are requested to register with the Office of Public Instruction in order to be kept up-to-date on new developments.

3. All installations of LP gas conversion equipment (carburetion, lines, tanks, fittings, etc.) shall meet or exceed all of the safety specifications set forth by the National Fire Protection Association, Inc.

4. The LP gas conversion and completed installation of equipment will be inspected by the Highway Patrol during the annual school bus inspections.

Installation of Equipment

1. The gasoline tank should be removed from the bus when converting to straight propane. If the gasoline tank is not removed, an anti-freeze, non-flammable solution must be added to the tank. The filler cap or door cover must be sealed so that the gasoline tank cannot be accidentally filled.

2. LP gas tanks shall be designed for installation on school buses.

3. Each tank shall be fitted with an 80 percent automatic filler shut-off valve.

4. A heat deflector must be installed between the LP tank and the exhaust pipe. The heat deflector must protect the LP tank from exhaust pipe heat and shall be enlarged if necessary.

5. The LP tank shall be mounted to the main frame rail. The tank may be mounted on either side or both sides of the vehicle.

6. Each mounting bracket which is used to mount the LP tank shall be attached to the frame with not less than grade five (5) bolts. Under no circumstances shall the tank be able to rotate or slip.

7. The tank shall be installed with as much road clearance as practicable, but not less than the minimum road clearance of the vehicle under maximum spring deflection (***not lower than the front axle).***

8. Tanks shall be ASME certified (par. no. 3810 of NFPA 58).

9. All tank valves, appurtenances and connections shall be adequately protected to prevent damage due to accidental contacts with stationary objects or from stones, mud or ice, thrown up from the ground, and from damage due to overturn or similar vehicular accident. Such protective devices shall be provided and affixed to the tank.

10. Tanks shall be equipped with a minimum of 250 lb. relief valve, with a maximum of 312 lbs.

11. Venting of the relief valve on a school bus shall be only as described in the following if it is to comply.

    a. The vent opening shall exit out the left side of the bus body below the floor line and shall be flush mounted with the body.

    b. The flex line used shall be metallic (other than aluminum). Other tubing used for the relief valve on the tank to the discharge port shall be of the same diameter as the relief valve.

    c. The discharge port shall be mounted in a recess in the lower part of the body skirt so that any discharge through the vent opening is directed at a 45 degree angle upward and perpendicular to the ground.

    d. The discharge port shall be fitted with a spring loaded rain cap to prevent moisture from entering the discharge port, and in its full open position minimize fuel and vapors from infringing upon the body, or other adjacent traffic, and installed at least three (3) feet horizontally away from any opening to the passenger area.

    e. The recess discharge port box shall be covered with a protective mesh to discourage vandalism.

12. The liquid level gauge (spitter valve) shall be fitted with a tamper-proof head.
    Exception: See remote fill system, 15a.

13. There shall be a hydrostatic relief valve installed between tank manual shut-off valve and the fuel lock-off unit. It must be installed in a bulkhead, pointed down with a rubber cap.

14. An opening in the skirt shall be made to provide adequate access to direct filling of the tank.

15. *Optional:* The remote fill box with fill valve and liquid level gauge (spitter valve) in a closed compartment with a locking door is permitted. Mounting must be in the bus body skirt. Check valve shall not be removed from filler valve at remote fill to eliminate any fuel trapped from tank fill valve and remote fill valve.

    a. On remote fill systems, the remote liquid level gauge (spitter valve) must be equipped with a manual shut-off at the point where the hose connects with the container.

    b. Also, the container must be protected at this point with **one** of the following:
        (1) the container must be constructed with a maximum opening of not larger than a No. 54 drill size.
        (2) an approved device restricting the flow with a maximum opening of not larger than a No. 54 drill size must be installed at the tank opening.
        (3) a properly sized excess flow valve must be installed at the tank opening with a manual shut-off valve.

16. The opening in the skirt to the direct tank fill valve shall be fitted with a spring loaded, forward or top mounted, hinged door. The door may be of the locking type.

Carburetion

1. The fuel system shall be equipped with at least three positive shut-off devices between the fuel supply and the engine.

    a. There shall be a manual shut-off at the tank.

    b. An automatic fuel lock-off between the fuel tank and the converter may be one of the following:
        (1) a vacuum fuel lock-off (UL approved).
        (2) an electrical fuel lock-off used in conjunction with a low pressure switch or a vacuum switch (both must be UL approved).

    c. Automatic fuel shut-off system within the converter unit (UL approved).

2. All fuel lines shall be of reinforced stainless steel wire braid and comply with 235 of NFPA 58. All fuel lines shall be UL approved, 1750 pound burst pressure.
   Exception: the fuel lines between the converter and the carburetor.

3. Hose ends and connections shall be of the same make (brand name) as the hoses for compatibility. Where a fuel line or a vent line passes through a bulkhead, a bulkhead fitting shall be used (UL approved).

4. All components such as hoses, hose ends, fittings, etc., shall bear the UL symbol.

5. Mounting of the carburetion system shall be done in a manner which will provide a solid vibration free system. The converter shall not be mounted on the fender inner panels, radiator supports, firewall or engine compartment partitions.

6. Sealant to be used shall be UL approved sealant for LP gas.

Filling Procedures

1. No passengers may be aboard the school bus while it is being filled.

2. The engine must be shut off while the bus is being filled.

3. There shall be no source of ignition within fifty (50) feet of the bus while filling.

4. There shall be a decal listing filling instructions affixed to the school bus body within two (2) inches of the fill door.

5. Protective gloves shall be provided and shall be worn by the person performing the filling of the fuel tank.

6. Filling attendants shall be instructed in proper filling procedures.

Minimum Standards
School Use of Four-Wheel Drive Vehicles

General

1. The Board of Public Education, with advice of the Montana Division of Motor Vehicles and the Superintendent of Public Instruction shall adopt and enforce policies, not inconsistent with motor vehicle laws, to provide uniform standards and regulations for the operation of four-wheel drive vehicles that do not meet school bus standards.

2. The Board of Public Education will approve or disapprove on an individual basis.

3. The alternative vehicle may be used when adverse road and/or weather conditions dictate; use of such a vehicle will be approved on an annual basis.

4. The vehicle will transport eight (8) passengers or less.

5. The four-wheel drive alternative vehicle will not be identified as a school bus by color, lighting, or other visual designation.

6. The four-wheel drive alternative vehicle will be inspected by the Montana Highway Patrol for safe operating conditions before it is used to transport children to or from school.

7. State reimbursement to the local school district will be based on the on-schedule rate of twenty cents ($.20) per mile.

Application

1. School districts will use Form T-12 to request permission to use a four-wheel drive alternative vehicle.

2. Reimbursement will be based on an on-schedule rate of twenty cents ($.20) per mile for the number of days that this alternative vehicle is used.

Special Equipment

1. The special equipment required will be:
   a. roll bar,
   b. seat belts for the driver and all passengers,
   c. first aid kit (24 unit),
   d. fire extinguisher (5 lb.),
   e. flags and/or flares, and
   f. body of alternative vehicle shall be made to include sign or signage that will designate the vehicle as a school vehicle.

Inspections

1. The Montana Highway Patrol will inspect four-wheel drive alternative vehicles used by school districts for adverse road and/or weather conditions.

2. The Highway Patrol will record their inspections on the regular T-10 (with the addition of roll bar and seat belt requirements).

3. The alternative vehicles will be inspected for inclusion and condition of the following equipment iisted on the T-10 school bus inspection form:
   a. head lamp
   b. turn signal lamps—front
   c. windshield
   d. windshield wipers
   e. exterior mirrors
   f. battery
   g. generator or alternator
   h. head lamp indicator
   i. horn
   j. interior mirror
   k. speedometer
   l. brakes
   m.* driver seat belt
   n. steering gear
   o. fire extinguisher (5 lbs.)
   p. first aid kit (24 unit)
   q. defroster
   r. heater
   s. interior lamp
   t.** ceiling
   u. seating
   v. tools and storage
   w. windows
   x. flags and/or flares
   y. shovel (securely fastened)—where required by forest regulation
   z. ax (securely fastened)—where required by forest regulation
   aa turn signal lamps—rear
   bb stop lamps
   cc exhaust system
   dd fuel tank
   ee tires (2/32" minimum)
   ff cleanliness

*seat belt for each passenger
**roll bar

20-10-102. School bus requirements. (1) A school bus may be operated by the district or other public agency for the conveyance of pupils or may be privately operated by a carrier to provide such conveyance of pupils under contract with a district or other public agency.

(2) Every school bus shall bear on the front and rear of the bus a plainly visible sign containing the words "school bus" in letters at least 8 inches in height.

(3) When a school bus is operated on a highway for purposes other than transporting pupils to and from school or for school functions, all markings identifying it as a school bus shall be concealed.

History: En. 75-7002 by Sec. 279, Ch. 5, L. 1971; amd. Sec. 2, Ch. 141, L. 1973; R.C.M. 1947, 75-7002(part).

20-10-111. Duties of board of public education. (1) The board of public education, by and with the advice of the Montana division of motor vehicles and the superintendent of public instruction, shall adopt and enforce policies, not inconsistent with the motor vehicle laws, to provide uniform standards and regulations for the design, construction, and operation of school buses in the state of Montana. Such policies shall:

(a) prescribe minimum standards for the design and construction of school buses not inconsistent with:

(i) minimum standards adopted by the national commission on safety education; or

(ii) minimum standards adopted by the national highway safety bureau;

(b) prescribe standards and specifications for the lighting equipment and special warning devices to be carried by school buses in conformity with:

(i) current specifications approved by the society of automobile engineers;

(ii) motor vehicle laws; and

(iii) the requirements that all school buses shall have an alternately flashing prewarning lighting system of four amber signal lamps to be used while preparing to stop and an alternately flashing warning lighting system of four red signal lamps to be used while stopped in accordance with 61-9-402;

(c) establish any other driver qualifications that may be deemed necessary in addition to the qualifications required in 20-10-103;

(d) prescribe criteria for the establishment of transportation service areas for school bus purposes by the county transportation committee which shall allow for the establishment of such areas without regard to the district boundary lines within the county;

(e) prescribe any other criteria for the determination of the residence of a pupil that may be deemed necessary in addition to the criteria established in 20-10-105;

(f) prescribe any other policies for the operation of school buses which are not inconsistent with:

(i) motor vehicle laws;

(ii) minimum standards adopted for school bus operation by the national commission on safety education;

(iii) highway safety standards; and

(iv) the transportation provisions of this title;

(g) prescribe standards for the measurement of the child seating capacity of school buses, to be known as the rated capacity.

(2) The board of public education may grant permission to the trustees of any district to use for transportation a four-wheel drive vehicle capable of transporting eight passengers or less that meets the minimum standards for these vehicles as prescribed by the board of public education if this type of vehicle will not be used to transport more than eight pupils per trip.

(3) Whenever the board of public education grants the trustees of a district permission to use a four-wheel drive vehicle under the provisions of subsection (2), the reimbursement to the district shall be based on the on-schedule rate of 20 cents per mile.

(4) The board of public education shall prescribe any other policy necessary for the proper administration and operation of individual transportation programs that are not inconsistent with the transportation provisions of this title.

History: En. 75-7004 by Sec. 281, Ch. 5, L. 1971; amd. Sec. 1, Ch. 416, L. 1973; R.C.M. 1947, 75-7004; amd. Sec. 1, Ch. 455, L. 1981.

Compiler's Comments

1981 Amendment: Inserted subsections (2) and (3).

Statement of Intent: The statement of intent attached to HB 662 (Ch. 455, L. 1981), provided: "a statement of intent is required for House Bill 662 because section 1 [20-10-111] delegates rulemaking power to the Board of Public Education.

The Board of Public Education is to promulgate rules prescribing minimum standards for four-wheel drive vehicles that are used as school buses. These standards are to relate to safety considerations and equipment requirements to insure that four-wheel drive vehicles used as school buses provide safe transportation for student transportees."

State of Montana
Office of Public Instruction
Ed Argenbright, Superintendent
Helena, MT 59620

School Bus Inspection

Montana Highway Patrol

Form T-10

This form, completed in its entirety, is required in accordance with Title 20, Chapter 10, Section 1, M.C.A. 1979

County_____ Dist. No._____ Bus No._____ Route No._____

Make of Bus Body_____ Year_____ Make of Chassis_____ Year_____

Vehicle I.D. No._____ License No._____ Year_____
From Registration Receipt

Rated Capacity_____ Based on 13 inches of Seating Space Per Pupil (Do not count driver seat)

Bus Owner_____ Address_____

Page No.	Item No.	Items listed in the Minimum Standard for School Buses in Montana	Approved Yes	No	*** NA	Page No.	Item No.	Items listed in the Minimum Standard for School Buses in Montana	Approved Yes	No	*** NA
13	1	Identification—front				16	26	Seating			
13	2	Head lamps				12	27	Floor			
10	3	Color				9	28	Aisle			
14	4	Turn signal lamps—front				17	29	Tools—storage			
13	5	Red & amber signals—front				18	30	Windows			
13	6	Marker lamps—front				14	31	Flags and flares			
18	7	Windshield				*—	32	Shovel (securely fastened)			
19	8	Windshield wipers				*—	33	Axe (securely fastened)			
15	9	Exterior mirrors				19	34	Buzzer emergency door			
3	10	Battery				11	35	Emergency door			
3	11	Generator or alternator				13	36	Red & amber signals—rear			
10	12	Service door				14	37	Turn signal lamps—rear			
6	13	Head lamp indicator				14	38	Stop lamps			
5	14	Horn				13	39	Marker lamps—rear			
15	15	Interior mirror				13	40	Identification—rear			
5	16	Speedometer				4	41	Exhaust system			
2	17	Brakes				5	42	Fuel tank			
16	18	Driver seat belt				7	43	Tires (1/32" min.)			
7	19	Steering gear				—	44	Cleanliness			
11	20	Fire extinguisher (5 lbs.)									
11	21	First-aid kit									
10	22	Defroster									
12	23	Heaters									
13	24	Interior lamps									
9	25	Ceiling									

On inspection, this bus is:

APPROVED (Date)_____

_____ Badge No._____
Signature of Inspecting Patrolman

** NOT APPROVED (Date)_____

_____ Badge No._____
Signature of Inspecting Patrolman

_____
Signature of District Official

*Where required by forest regulation.

**All vehicles not approved on first inspection must be reinspected by the Highway Patrol as soon as all defects are corrected.

*** Not applicable.

State of Montana Office of Public Instruction Ed Argenbright, Superintendent Helena, MT 59620	**Montana Highway Patrol** **SCHOOL BUS REINSPECTION**	Form T-3

This form, completed in its entirety, is required when a school bus has been found defective and has failed to meet the minimum standards. Reinspection is necessary after defects are remedied.

Inspecting Highway Patrolman:

1. Prepare original and four copies of this form:
   (a) Mail original to: Montana Highway Patrol, Helena, MT 59601. After processing the form will be forwarded to the State Superintendent;
   (b) One copy to: County Superintendent of Schools;
   (c) One copy to: District Superintendent of Schools, **or** if no Superintendent, one copy to the Chairman of the Board of Trustees of the district owning the bus or having the bus under contract;
   (d) One copy to: Contractor;
   (e) Retain one copy in your files.
2. If this bus fails to be approved on reinspection, discuss defects with responsible person and schedule date for another reinspection.

County_____ Dist. No._____ Bus No._____ Route No._____

Make of Bus Body_____ Year_____ Make of Chassis_____ Year_____

Vehicle I.D. No._____ License No._____ Year_____
Registration Receipt

Rated Capacity_____ Based on 13 inches of Seating Space Per Pupil

Bus Owner_____ Address_____

Date of Previous Inspection....., 19.....

DEFECTS NOTED ON PREVIOUS INSPECTION

ITEM NUMBER	YES CORRECTED	NO

ITEM NUMBER	YES CORRECTED	NO

On reinspection, this bus is: ( ) approved ( ) not approved Date....., 19.....

.....Badge No.....

Signature of Inspecting Patrolman

Signature of District Official

FT-3781